North American Transportation Energy Use in 2050

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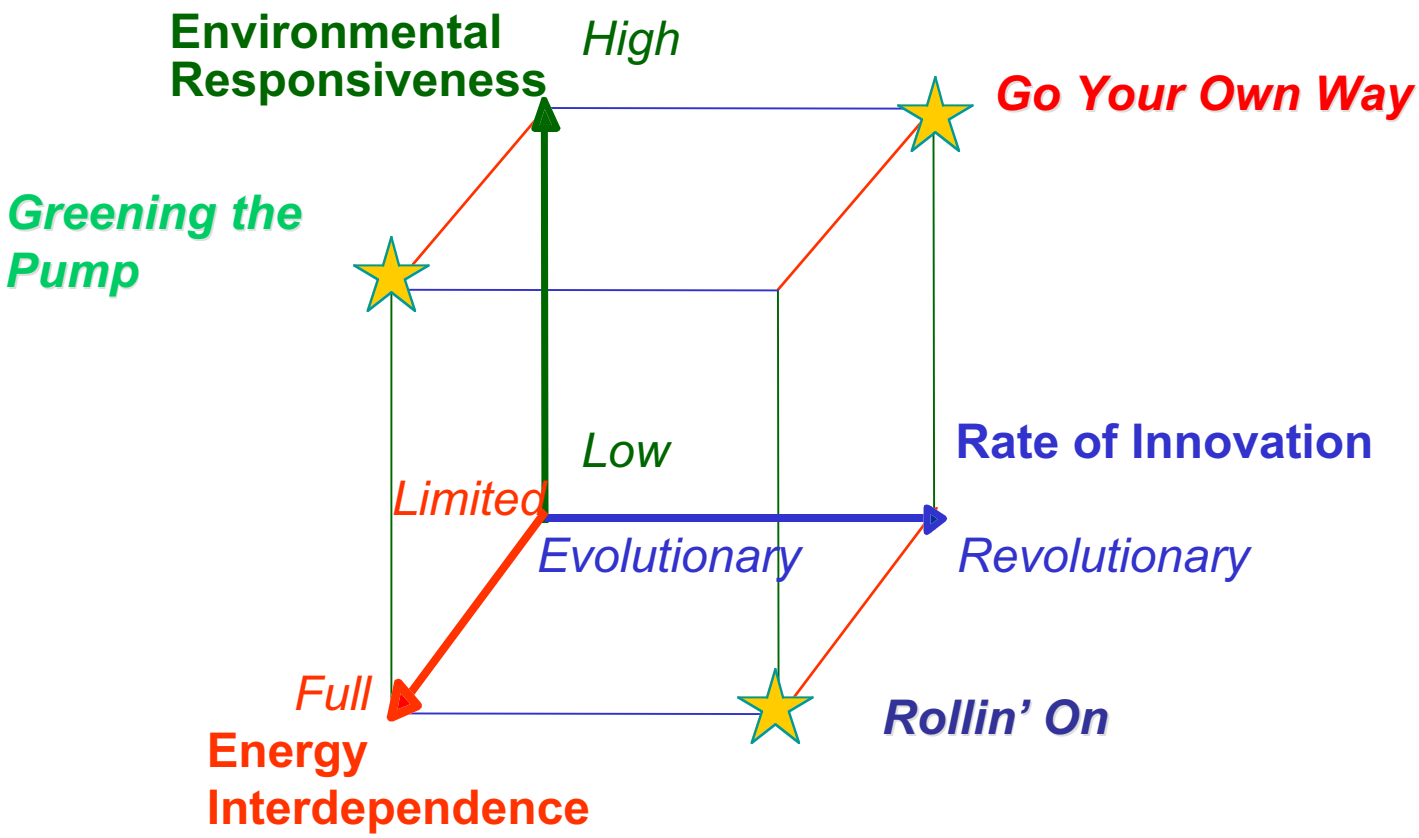
U.S. DOE & NRCan Study of Alternative Transportation Futures

- Evaluates the energy, oil, carbon and cost implications of alternative transportation futures
- 2050 focus
- Covers all modes, though initial focus is on on-road
- Alternative futures vary by vehicle and fuel technologies and total travel
- “In process”: presentation is a progress report

Alternative Futures Represented in Three Scenarios Plus Base Case

- Scenarios are visions of what North America in particular and the World could look like
- Scenarios are built on three specific drivers:
  - Environmental sensitivity
  - Technological innovation
  - North American energy market integration
- Base case for U.S. is a Fixed MPG case (fixed at 2000 CAFÉ levels)
  - Canada assumes modest FE improvements

2050 Scenarios and Their Drivers



Various Models and Papers Used to Evaluate These Scenarios

- Champagne
- World Energy Scenarios Model
- Vehicle costs
- Hydrogen infrastructure
- Cellulosic ethanol resources
- Natural gas resources
- Canadian oil sands resources

To-date, Main Comparison Is Between Greening-the-Pump and Fixed MPG Base Case

- Greening-the Pump (GtP) on drivers:
  - High on environmental responsiveness and energy market integration
  - Low on pace of innovation
- Underlying assumptions of GtP:
  - Environmentally friendly technologies that exist or are close to deployment are introduced quickly into the market
  - Demand management is very successful in this low growth, environmentally conscious world

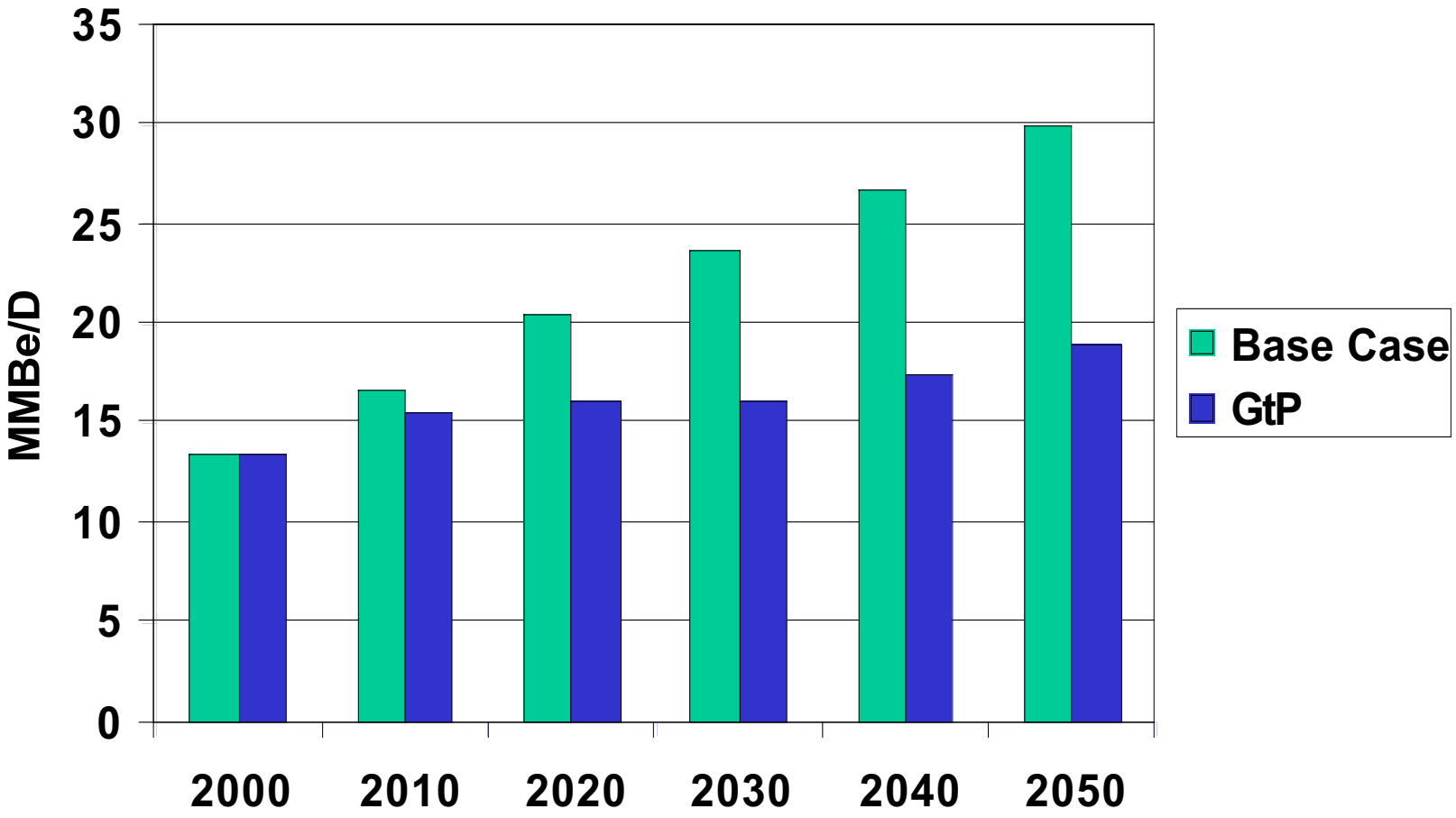
Selected Characteristics of GtP and Base Case (U.S.)

	Base Case	GtP
LDVs		
LDV VMT Growth Rate	AEO 2002 rates to 2020 with further decline post-2020	15% less than Base (by 2015)
New Car/LDT split	50%/50%	62%/38% (by 2015)
New ICE car MPG	28.5	41 (by 2025)
% Hybrids/FCVs of new LDVs	0%/0%	10%/0% (by 2015)

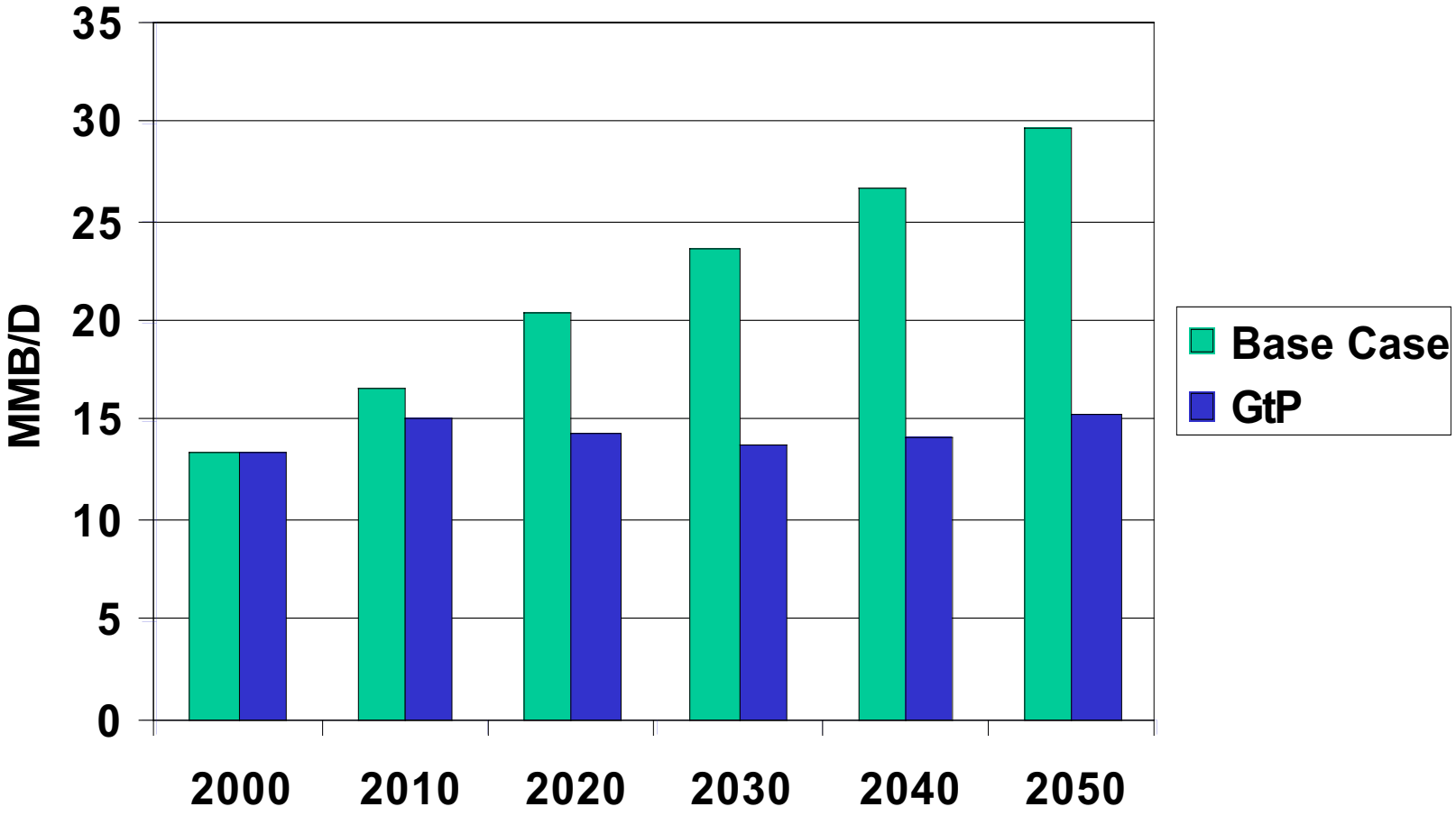
Selected Characteristics (continued)

	Base Case	GtP
E10 in LDVs	None	Mandatory by 2020
E85 in LDVs	None	20% of LDVs sold use E85 (by 2020)
CNG/LPG in LDVs	None	3% (by 2025)
Aviation	Medium growth rate	Lower than Base
Rail	Medium growth rate	Higher than Base

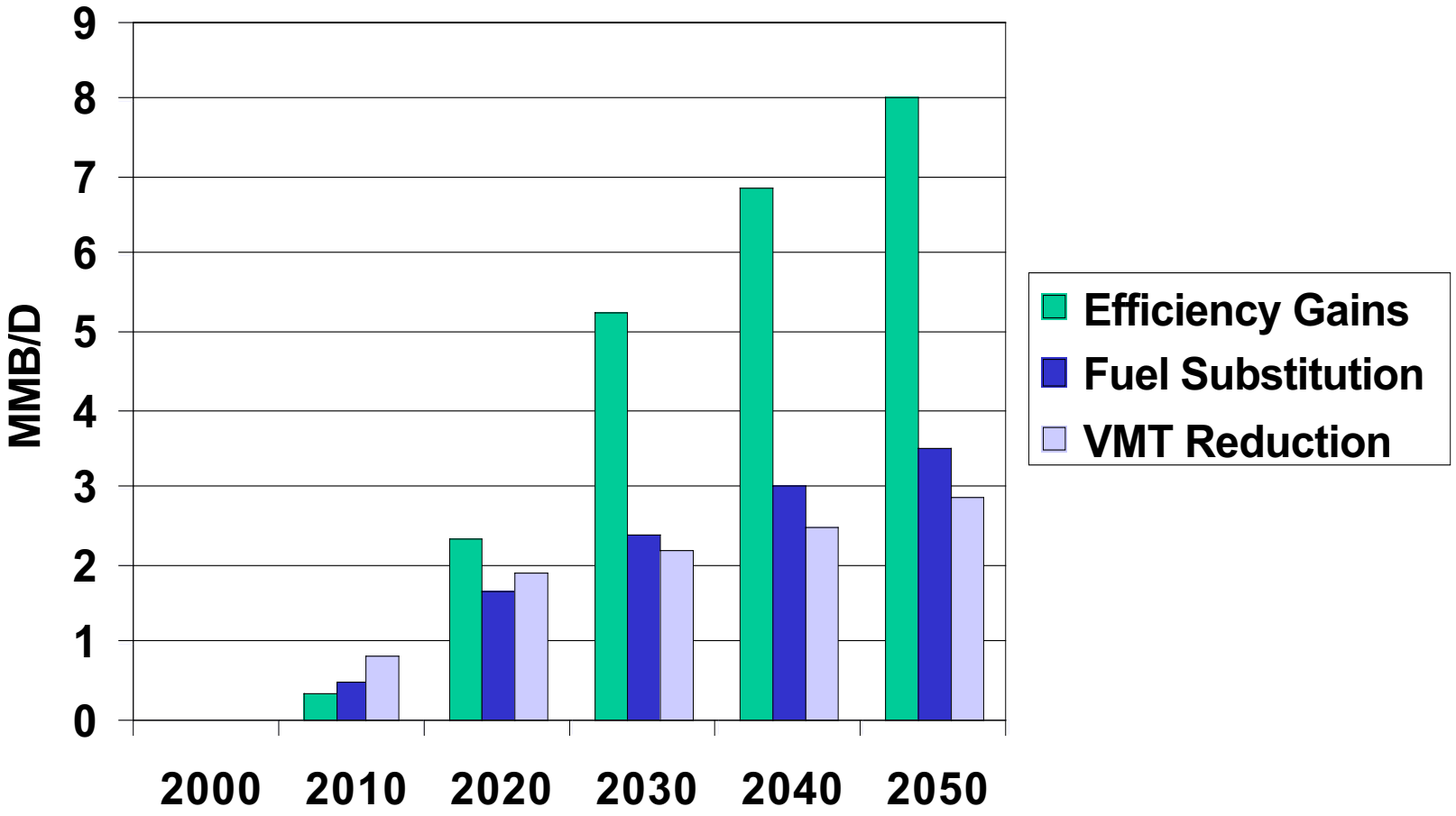
GtP Uses 20% Less Total Transportation Energy by 2020 and 40% Less by 2050 (U.S.) (Illustrative)



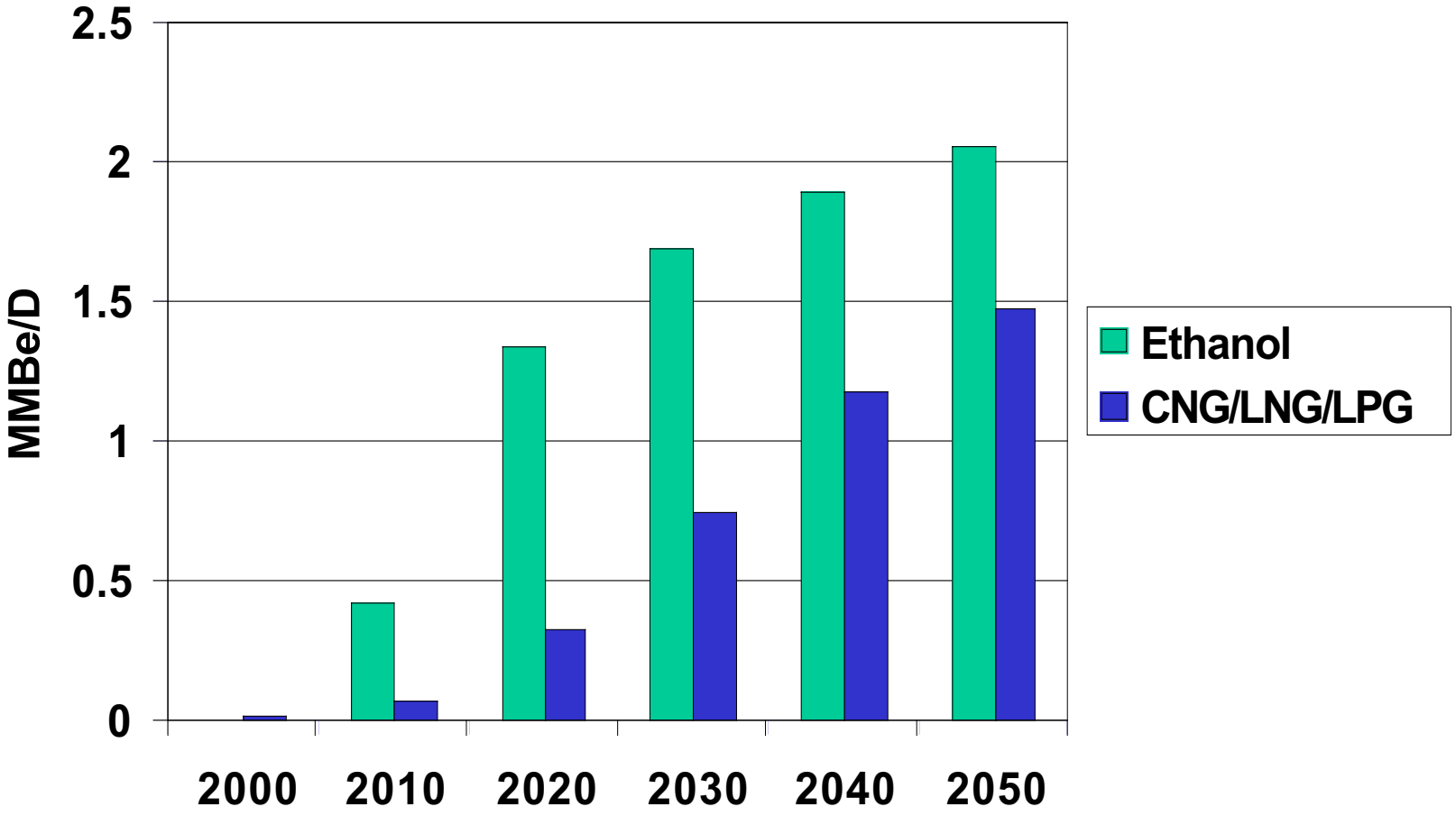
GtP Uses 30% Less Total Transportation Oil by 2020 and 50% Less by 2050 (U.S.) (Illustrative)



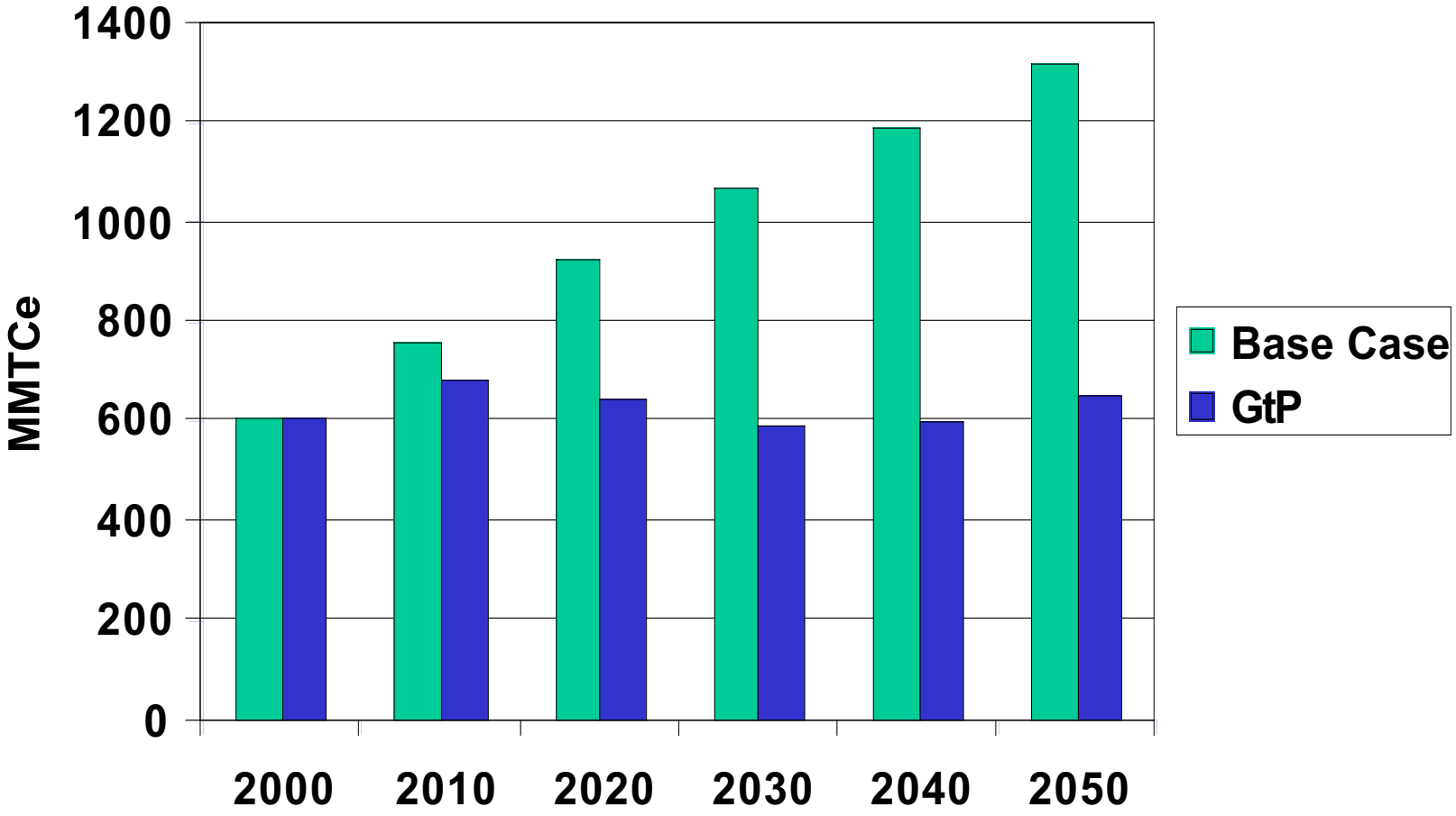
Oil Reduction Is From Three Sources



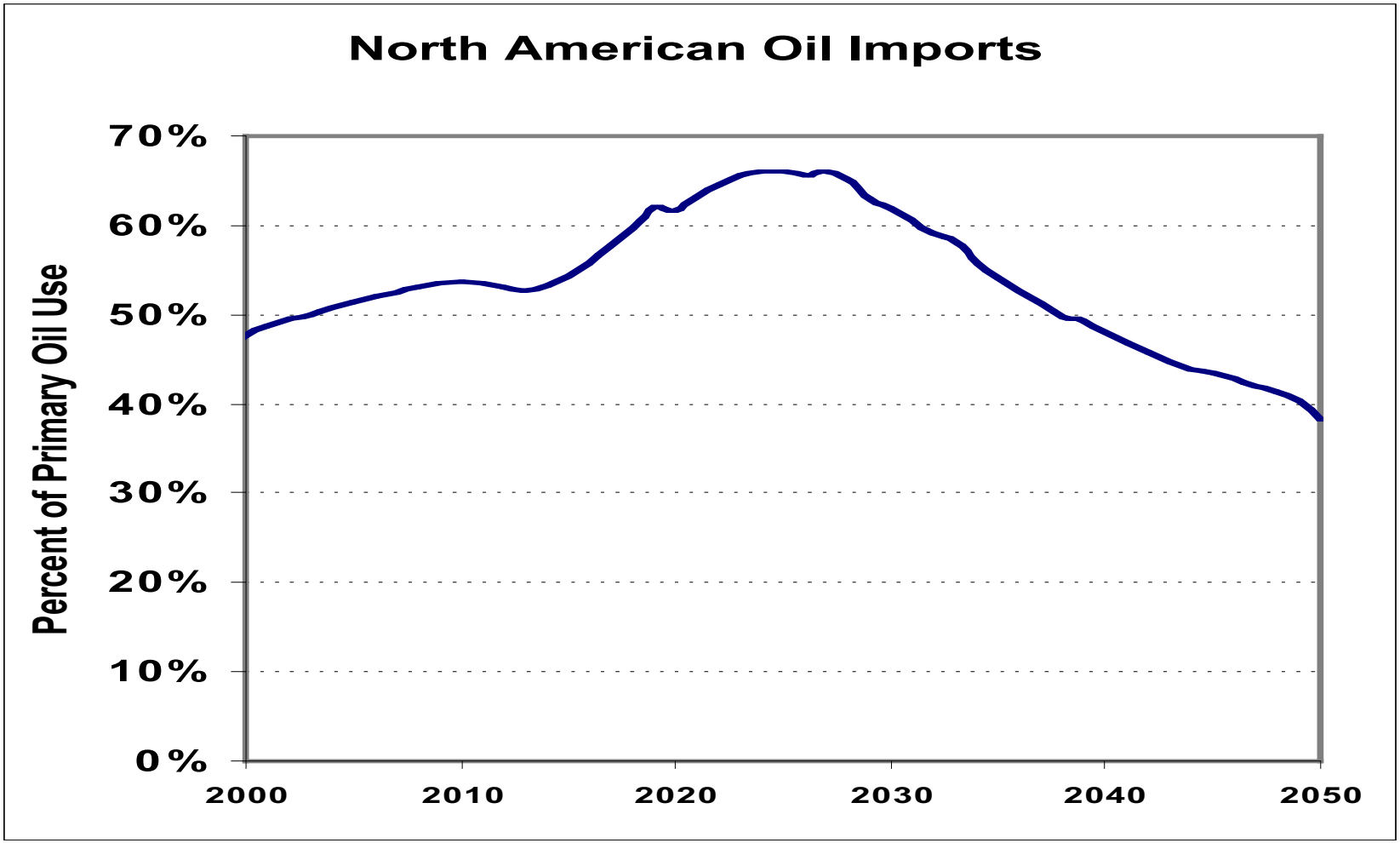
Alternative Fuels in GTP



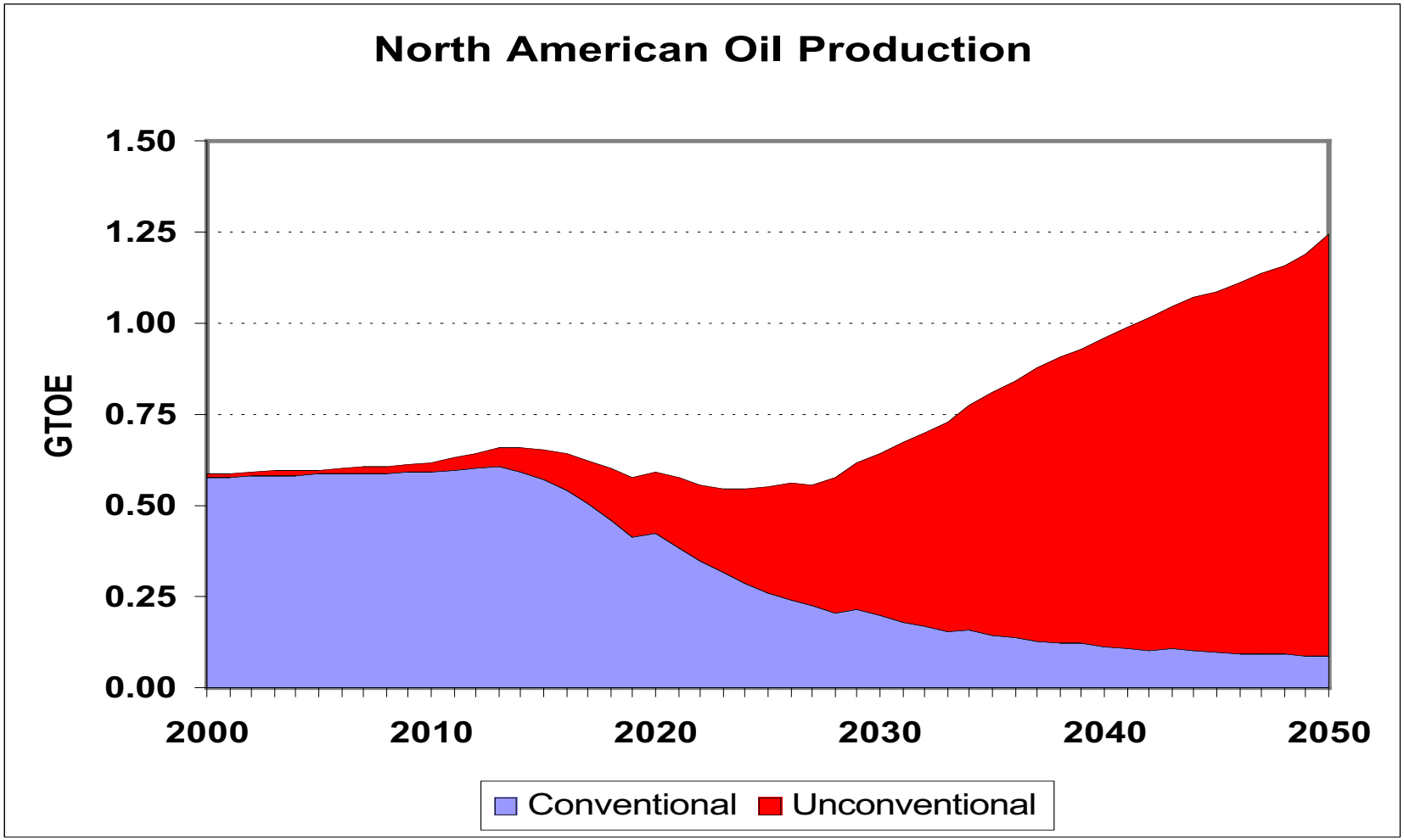
Carbon Emission Reductions in GtP Track Oil Use Reductions (U.S.) (Illustrative)



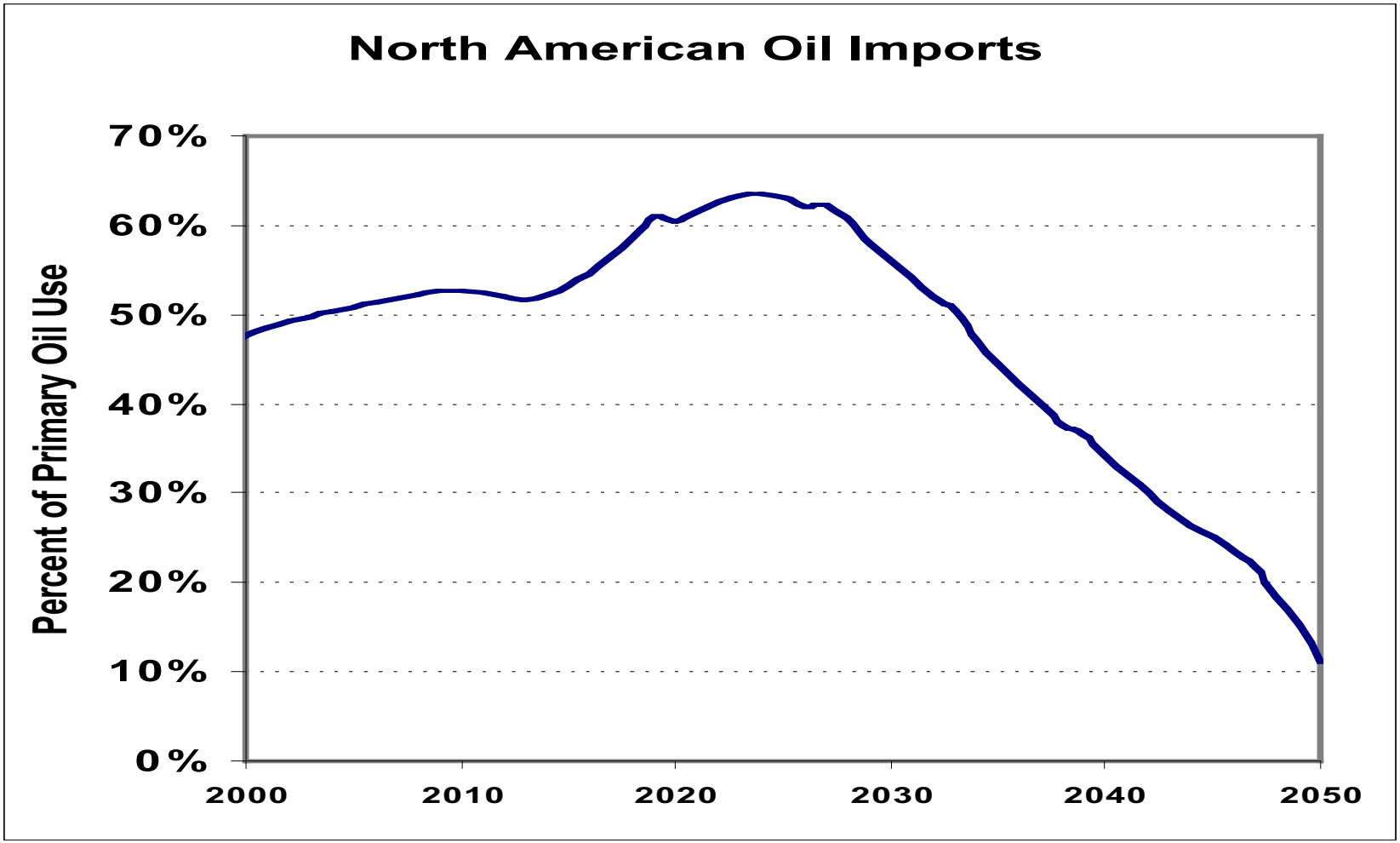
North American Base Case Oil Imports Peak in 2025, Then Decline (Illustrative)



Vast Majority of NA Unconventional Oil Supply Comes From Canadian Oil and Tar Sands (Illustrative)

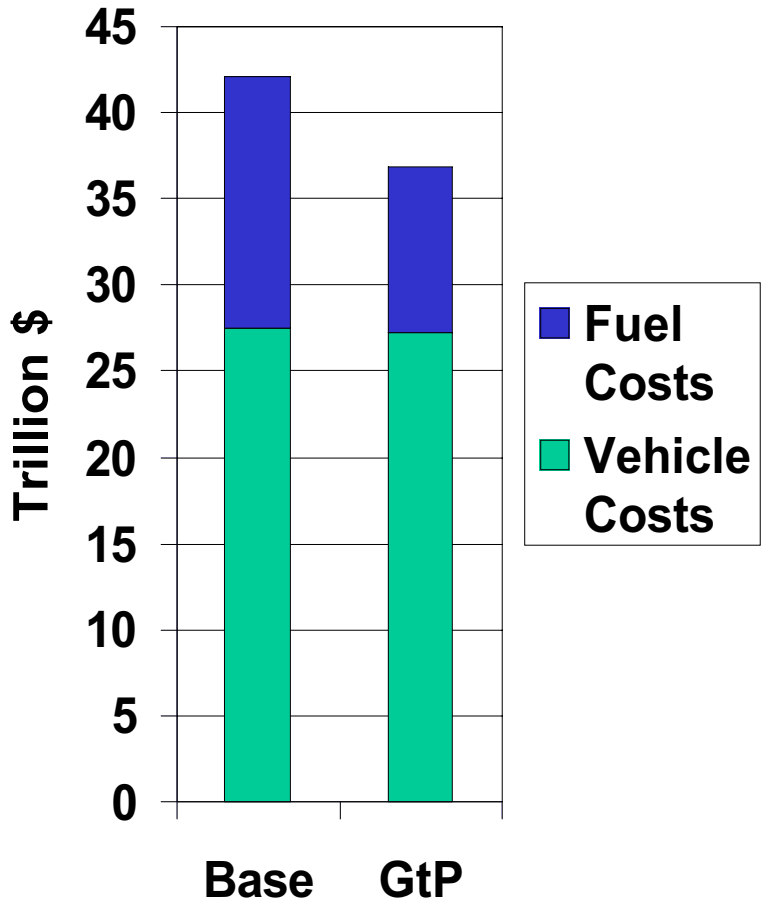


In GtP, Energy Conservation Further Reduces NA Oil Imports to Near Zero (Illustrative)



GtP Cumulative Total Costs are Lower than Base (U.S.) (Illustrative)

- 50 year, highway only costs
- Vehicle costs are the same
  - Few advanced technology vehicles
- Fuel costs are lower in GtP
  - Use less fuel, even though more expensive
  - Taxes or subsidies not included



Next Steps

- Complete the runs for all 3 scenarios
  - Next: GYOW with FCVs
- Evaluate the 3 scenarios relative to one another
  - What technology combinations get the greatest benefits in terms of energy use, oil use, carbon emissions and cost?
- Prepare draft report